REMARKS

Applicant hereby submits this Response and Amendment to respond to the Office Action dated May 17, 2007. Claims 1-51 have been examined. Applicant thanks the Examiner for once again noting that claims 10, 17, 21-23, 34, 35, 37, 41, and 47-49 contain allowable subject matter and would be allowed if rewritten in independent form including all limitations of their base claims and any intervening claims. However, Applicant believes that all of claims 1-51 also continue to contain allowable subject matter for the reasons previously submitted on February 20, 2007 and as discussed below. Claims 1, 20, 24, 28, 29, 43, and 50 have been amended to more clearly claim the invention of the subject application and correct minor typographical errors noted by the Applicant. Therefore, Applicant respectfully requests the Examiner reconsider the rejections of claims 1-9, 11-16, 18-20, 24-33, 36, 38-40, 42-46, 50, and 51 to find all claims presently in the application allowable based on the above indicated amended claims, amendments and remarks previously submitted, and the Remarks that follow. Applicant notes for the record that a number of these claim amendments are made to facilitate the Examiner's understanding of the claims.

The Applicant has reviewed the prior art cited and applied in the Office Action mailed May 17, 2007, and the reasons indicated for the rejection of claims 1-9, 11-16, 18-20, 24-33, 36, 38-40, 42-46, 50, and 51. These rejections are respectfully traversed. Applicant has amended claims 1, 20, 24, 28, 29, 43, and 50 to more clearly claim the invention. Applicant has amended claim 38 to correct for the incidental insertion of a word into the original claim. Further, Applicant has also amended claims 36, 43 and 51

to correct minor typographical errors. Applicants have also amended claims 38 and 43 to overcome the Examiner's objections. Applicant respectfully requests reconsideration in light of the claim amendments and following remarks. Applicant respectfully submits that claims 1-9, 11-16, 18-20, 24-33, 36, 38-40, 42-46, 50, and 51 should be allowed for the following reasons.

First, for the record, Applicant would like to point out that the application of the citing of U.S. Patent No. 5,435,172 issued to Pelters et al. on Form PTO-892 was unnecessary because this reference was already of record and was previously identified by the Applicant in Form PTO-1449 filed by the Applicant with the present application on September 9, 2003. This reference has been of record in this family of patent application cases for around 10 years, originating in the parent patent application.

Second, Applicant points out that the Examiner failed to address numerous points of patentability that the Applicant identified and argued about for various dependent claims (e.g., claims 7, 30, 36, 38, etc.) in the last Response and Amendment, and Pelters et al. failed to make up these deficiencies. With respect to those claims, the Examiner has not address the various limitations of these claims and clearly failed to make a prima facie case for rejecting these claims, and thus these claims are presumptively patentable even though the Examiner has noted them rejected (without any specific statement about why or how the claims are rejected). Applicant respectfully requests the Examiner to note for the record the patentability of these claims.

The Examiner again rejected claim 50 under 35 USC § 102(b) as being anticipated by Yamashita et al. (US Patent 5,727,383). This rejection is again respectfully traversed. Although not necessary for patentability, Applicant has amended

claim 50 to more clearly claim the invention for the benefit of the Examiner. For the following reasons, claim 50 is patentable over Yamashita et al.

Applicant appreciates the Examiner's comments regarding claim 50 in the Response to Arguments section indicating that not all the limitations argued by the Applicant were explicitly recited in claim 50. In response, Applicant has amended claim 50 to include the language "by detecting catalyst temperature changes" so that the limitations are explicit. However, Applicant notes that there were three different points made with respect to why claim 50 is patentable over Yamashita et al., and Applicant believes each one is an independent and sufficient reason for patentability. The Examiner only addressed one of these points. In any case, claim 50 is not anticipated or rendered obvious by Yamashita et al. for at least the following reasons.

Yamashita et al. fails to anticipate claim 50 for at least the reason that Yamashita et al. does not disclose, teach or suggest each and every element and limitation of the claim. In particular, Yamashita et al. does not disclose "controlling said device for ***compensating*** adverse changes in cylinder intake airflow" as recited in claim 50. Rather, Yamashita discloses a device that ***measures*** airflow and intake air quantity in order to detect catalytic converter deterioration. (See Yamashita et al. at, for example, Col. 2, lines 3-22; Col. 9, lines 57-61; Col 10, lines 12-19, lines 35-55). Instead of compensating for ***instantaneous*** airflow as in the present invention embodied in claim 50, Yamashita measures the ***accumulated*** airflow to estimate the quantity of heat required to reach catalyst activation (See Yamashita et al. at, for example, Col. 2; lines 3-22; Col. 10, lines 35-55). Yamashita, therefore, does not disclose, teach or suggest a method for diagnosing a catalyst by detecting catalyst temperature changes, but instead,

measures accumulated airflow up to a certain catalyst temperature. Therefore, Applicant respectfully submits that Yamashita fails to disclose "controlling said device for ***compensating*** adverse changes in cylinder intake airflow" as included in claim 50 of the present invention and the claim is not anticipated (or rendered obvious) by Yamashita et al. for at least the reason that Yamashita fails to disclose, teach or suggest each and every limitation of the claim. Applicant respectfully requests that the Examiner withdraw the rejection of claim 50 or address in detail each of the points made by the Applicant for the patentability of this claim.

The Examiner rejected claim 51 under 35 USC § 102(b) as being anticipated by Pelters et al. (US Patent 5,435,172). This rejection is respectfully traversed. For at least the following reasons, claim 51 is patentable over Pelters et al.

Pelters et al. also fails to anticipate claim 51 for at least the reason that Pelters et al. does not disclose, teach or suggest each and every limitation of the claim. In particular, Pelters et al. does not disclose causing "the temperature of the catalyst to rapidly rise when...engine operational conditions preclude establishing stoichiometric closed loop fuel control operation" as recited in claim 51. Rather, Pelters discloses a process that tests the operating efficiency of exhaust gas catalysts by switching off the ignition to thereby create an exhaust gas pulse. (See Pelters et al. at, for example, Col. 2; lines 46-50 and Col. 4, lines 52-54). In order to obtain catalyst testing results, therefore, Pelters et al. must turn off the ignition to create an exhaust gas pulse. Further, in Pelters et al., the engine is operating in an idling state or coasting state. (See Pelters et al. at, for example, Col. 2; lines 26-45 and Col. 4, lines 43-51). As such, in both cases, the engine in Pelters et al. is operating in closed loop fuel control operation, though it

may be doing so while being either under-stoichiometric or over-stoichiometric as a result of the exhaust pulse. On the other hand, as recite in claim 51 the engine operations are occurring when conditions preclude establishing stoichiometric closed loop fuel control operation (e.g., just after a cold start condition before closed loop fuel control operation can begin). Further, Applicant notes that the Examiner rejects claim 51 repeating the claim language and using a very general reference to col. 2, line 10+ and col. 4, line 18+, without providing any specificity. This approach is objected to by the Applicant. Therefore, Applicant respectfully requests the Examiner to point to where in Pelters et al. there is a particular statement supporting the anticipation of claim 51, and in particularly providing specifics as to the noted language of claim 51, or withdraw the rejection of claim 51 for at least the reason that Pelters et al. fails to disclose, teach or suggest each and every limitation of the claim.

Based on the aforementioned and the reasoning provided in the February 20, 2007 Response and Amendment (hereby incorporated herein), Applicant respectfully submits that claims 50 and 51 are not anticipated by either Yamashita et al. or Pelters et al., and are patentable for at least the reasons given above. **If for some reason the Examiner disagrees, Applicant respectfully requests an Examiner Interview to discuss the rejections in more detail.**

The Examiner rejected claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46 under 35 USC § 103(a) as being anticipated by Maus et al. (U.S. Patent 5,610,844) in view of Pelters et al. (US Patent 5,435,172). This rejection is respectfully traversed. As noted above, claims 1, 20, 29, and 43 have been amended to more clearly claim the

invention of the subject application. For the following reasons, claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46 are patentable over Maus et al in view of Pelters.

Maus et al. fails to anticipate claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46 for at least the reason that Maus et al. does not disclose, teach or suggest, each and every element and limitation of the claims. In particular, Maus et al. does not disclose a method of diagnosing a catalyst including "controlling changes to conditions of **selected individual engine cylinders ... without turning off ignition operation**" as recite in amended claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46. Nor does Maus et al. teach or suggest such a limitation. Rather, Maus et at. discloses a system that introduces excess fuel **equally to all cylinders** at a desired level to diagnose a catalyst.

Maus et al. discloses a method of catalyst diagnosis that uses a momentary disabling of the ignition system voltage to the engine's spark plugs to cause an unburned fuel and air mixture to exit the engine's exhaust. (See Maus et al. at, for example, col. 8, lines 16-29). Maus teaches that the "electronic control...**controls the engine** through control **lines**" so that the "operational condition of the internal combustion **engine** is briefly disrupted ... . This can take place ... by a brief injection of additional fuel **while simultaneously switching off the ignition** during a load phase." (See Maus et al. at Col. 8, lines 16-23). Maus et al. mentions injection of additional fuel, but says nothing about controlling changes to conditions of selected individual engine cylinders. Rather, Maus et al. discloses a system that controls the "engine 1" by multiple "control lines 9" such that **all individual cylinders' are controlled alike**. As shown in Fig. 1 of Maus et al., there is no detail to engine 1 and the control lines 9 are not designated for any particular purpose. Because Maus et al. teaches his system is responsive to the exhaust

gases of **all** engine cylinders, it is therefore unable to control the quantity of fuel to **selected individual cylinders** as has been disclosed by the Applicant, nor is it inherent in Maus et al. Maus et al. fails to disclose, teach or suggest anywhere that the individual cylinders of the engine are set independently to gas and air flows different from one another as is taught by the present invention. Further, Maus explicitly states at col. 8, lines21-23 that the system will "simultaneously switching off of the ignition … ." Therefore, Applicant respectfully submits that Maus fails to teach or suggest controlling changes to the conditions of **selected individual cylinders … without turning off ignition operation** as indicated in amended claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46 of the present invention, and the claims are not rendered obvious by Maus et al. for at least the reason that Maus fails to teach or suggest each and every limitation of the claims.

Pelters et al. fails to make up for the deficiencies of Maus et al. As stated above, Pelters discloses a process that tests the operating efficiency of exhaust gas catalysts by switching off the ignition to thereby create an exhaust gas pulse. (See Pelters et al. at, for example, Col. 2; lines 46-50 and Col. 4, lines 52-54). In order to obtain catalyst testing results, therefore, Pelters et al. must turn off the ignition to create an exhaust gas pulse. Further, the disclosure of Pelters et al. is ambiguous as to whether its process is capable of controlling conditions of selected individual cylinders. The Examiner references col. 2, lines 45-50 and 55-66 to support that Pelters et al. teaches changing conditions of selected individual cylinders. Applicant respectfully disagrees. Pelters et al. states at col. 2, lines 45-50 that "During coasting operation, in which the fuel supply is normally interrupted, the exhaust gas pulse can be generated, for example, by the

injection of fuel into at least one cylinder, the ignition of which may be switched off for this purpose." Applicant believes that this is at best an ambiguous statement from which one skilled in the art is likely to conclude that the resulting "injection of fuel into at least one cylinder" results from the ignition being turned off such that any fuel entering any of the cylinders during the time the ignition is turned off will flow to the catalyst without being burned. This is not controlling changes to the conditions of selected individual cylinders as disclosed in the present invention. Further, the fuel injection system 4 shown in Figure 1 of Pelters et al. and the signal carrying line 9 connected to the fuel injection system 4 are shown as single components rather than individual components, more consistent with a single throttle body engine fuel injections system. Although Pelters et al. in the detailed Description at col. 4, lines 46-64 may suggest that the fuel control may be achieve for selected individual cylinders, Applicants respectfully submit that this ambiguous description may also be interpreted to conclude that the process of Pelters et al. operates by turning off the ignition to all cylinders and activates one valve to provide fuel from the fuel injection system 4 only at a time appropriate for introducing fuel to one of all the cylinders (at random and not selected specifically), i.e., for a short period of time, during the two crankshaft rotations (four cycle engine) when the ignition is off. In any case, it is clear that the process of Pelters et al., like Maus et al., necessarily turns off the ignition at times so that fuel entering the cylinders will not be burned and is exhausted to the catalyst. However, as noted above, the present invention does not disable or turn off the ignition to test the catalyst. Thus, Pelters et al. fails to make up the deficiencies of Maus et al.

Based on the aforementioned, Applicant respectfully submits that both Maus et al. and Pelters et al. fails to teach or suggest controlling changes to the conditions of **selected individual cylinders without turning off ignition operation** as indicated in amended claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46 of the present invention, and the claims are not rendered obvious by Maus et al. and Pelters et al., whether taken individually or in combination, for at least the reason that Maus et al. and Pelters et al. fails to teach or suggest each and every limitation of the claims.

Claim 7 is also patentable over Maus et al. in view of Pelters et al. for at least the additional reason that neither Maus et al. nor Pelters et al. does not disclose, teach or suggest determining whether the catalytic converter is malfunctioning by using the first temperature characteristic and the second temperature characteristic for modifying changes in gas concentrations entering said catalyst from an engine. It is telling that the Examiner fails to even discuss claim 7 specifically in this rejection. As such, the present invention may modify the quantity or frequency of the unburned fuel and air mixture based on any temperature characteristic. On the other hand, Maus only teaches that a change in the quantity or frequency of the unburned fuel and air mixture may be selected to differ from all conceivable operationally caused changes in order to associate a measured temperature characteristics with that change. (See Maus et al. at Col. 4, lines 5-24). Maus et al. fails to indicate anywhere that the quantity or frequency of the unburned fuel and air mixture may be selected based on a measured temperature characteristic. Pelters et al. does not discuss this aspect of the process at all. Therefore, Applicant respectfully requests the Examiner to withdraw the rejection of

claim 7 or point to a place in Maus et al. or Pelters et al. that shows modifying the changes in gas concentrations based on measured temperature characteristics.

Claim 8 is also patentable over Maus et al. in view of Pelters et al. for at least the additional reason that Maus et al. does not disclose that a design of a catalytic converter is selected to provide consistent (to increase the consistency of diagnosis) and discernment of differences between ... malfunctioning and marginally good catalytic converters, as recited in claim 8. Rather, Maus discloses that the accuracy of a ***given*** catalytic converter, especially those of greater lengths, may be increased by measuring temperature at multiple locations or partial volumes of ***given*** catalytic converter. (See Maus et al. at, for example, Col. 5, lines 8-18). Maus makes no mention of selecting shorter length catalytic converters to improve the accuracy of its diagnosis, but only of increasing the number of temperature sensors when the length of the catalytic converter increases. (See Maus et al. at Col. 8, lines 52-56). Nor does Maus address selecting a catalytic converter design to provide for consistent results from a catalyst's diagnosis, independent of said diagnosis' accuracy, or a method to distinguish malfunctioning catalysts from marginally good catalysts. Once again, the Examiner fails to state where in Pelters et al. such aspects of the present invention are discussed. Therefore, Applicant respectfully submits that both Maus and Pelters fails to render obvious claim 8 for at least the reason that both Maus et al. and Pelters et al., together or separate fails to disclose each and every limitation of the claim.

Claim 16 is also patentable over Maus et al. in view of Pelters et al. for the additional reason that neither Maus et al. nor Pelters et al. disclose, teach or suggest determining a third temperature characteristic ***after disabling the change in exhaust gas***

concentrations ... so as to confirm test condition consistency, as recited in claim 16. Again, the Examiner fails to give any statement as to where Pelters et al. discloses such aspects of the invention; for good reason, because it doesn't. Maus et al. merely discloses taking temperature measurements "***during changes of the chemical and/or physical properties of the gas mixture***" at multiple *locations*. (See Maus et al. at, for example, Col. 4, lines 57-64). Maus fails to disclose taking any subsequent temperature measurements ***after*** the changes of chemical and/or physical properties of the gas mixture so as to confirm test condition consistency. Applicant respectfully requests the Examiner to point to where in Maus et al. or Pelters et al. there is a particular statement supporting the unpatentability of claim 16, or withdraw the rejection of claim 16 because Maus et al. in view of Pelters et al. fails to disclose, teach or suggest each and every limitation of the claim.

Claim 20 is also patentable over Maus et al. in view of Pelters et al. for the additional reason that Maus et al. and Pelters et al. do not disclose, teach or suggest "causing cycling of exhaust air-fuel ratio characteristics between rich and lean" as recited in claim 7. Rather, as mentioned above, Maus only teaches causing a "brief injection of additional fuel," which merely causes exhaust air-fuel ratio characteristics to become rich for a brief moment before returning to stoichiometric. (See Maus et al., for example, at Col. 8, lines 15-21). Maus fails to indicate anywhere that exhaust air-fuel ratio characteristics cycle between rich and lean. Once again, the Examiner fails to point to anywhere in Pelters et al. where this exists, because it is not disclosed, taught or suggested by Pelters et al. Therefore, Applicant respectfully submits that Maus in view of Pelters et al. fails to render claim 20 obvious for the additional reason that both Maus

et al. and Pelters et al. fails to disclose, teach or suggest each and every limitation of the claim.

Claim 36 is also patentable over Maus et al. in view of Pelters et al. for the additional reason that neither Maus et al. nor Pelters et al. disclose, teach or suggest a method for ***increasing heating rates*** of a catalytic converter by detecting at least one operational condition "prior to entering stoichiometric engine operation after cold start, and controlling changes in exhaust gases' concentrations entering said catalyst...***upon initiation*** of catalyst chemical exothermic activity" as recited in claim 36. Rather, Maus only teaches that "it is possible to ***check*** various aspects of the operation of the catalytic converter" by observing the derivative of a temperature characteristic. (See Maus et al. at, for example, Col. 8, lines 2-6). Maus discloses a method of ***"checking" the diagnosis*** of the catalytic converter by observing whether "the start of the catalytic reaction" and the measurement of the temperature probes is consistent with the diagnostic results. (See Maus et al. at, for example, Col. 8, lines 2-15). Maus, therefore, fails to disclose, teach or suggest detecting the start of the catalytic reaction for the purpose of heating the catalytic converter ***at a faster rate*** after cold start. Maus' detection of the start of the catalytic reaction serves a different purpose than the present invention; so Maus also fails to disclose controlling changes in exhaust gases' concentrations entering the catalyst ***upon*** said detection. Maus fails to disclose relating the time that the "operational condition of the internal combustion engine is briefly disrupted" to the determination of the start of the catalytic reaction. (See Maus et al. at, for example, Col. 8, lines 16-20). And once again, the Examiner is silent about this claim and the Pelters et al. disclosure. For good reason, because Pelters et. al. fails to teach or suggest such

limitations. Therefore, Applicant respectfully submits that Maus and Pelters fail to render claim 36 obvious for the additional reason that both Maus et al. and Pelters fail to disclose, teach or suggest each and every limitation of the claim.

Claim 38 is also patentable over Maus et al. in view of Pelters et al. for the additional reason that neither Maus et al. nor Pelters et al. disclose, teach, or suggest disabling changes in exhaust gas concentrations upon measuring conditions indicating catalyst temperature conditions are approached defined values, as recited in claim 38. Maus et al. is directed to diagnosing the condition of a catalyst by changing exhaust gas concentrations with an injection of additional fuel ***for a brief moment.*** (See Maus et al. at, for example, Col. 8, lines 16-21). Not only does Maus fail to disclose disabling said changes for any reason, but said changes occur nearly instantaneous so as to be practically incapable of being disabled. Again, the Examiner has failed to state anything about Pelters et al. disclosing this aspect of the present invention, because it does not exist. Applicant respectfully requests the Examiner to point to where in Maus et al. or Pelters et al. where there is a particular statement supporting the obviousness of claim 38, or withdraw the rejection of claim 38 for the additional reason that Maus et al. and Pelters et al. fails to disclose, teach or suggest each and every limitation of the claim.

Claim 40 is also patentable over Maus et al. in view of Pelters et al. for the additional reason that Maus et al. and Pelters et al. do not disclose, teach or suggest that a catalytic converter design can be selected to increase the accuracy of its diagnosis or discernment of temperature, as recited in claim 40. Rather, Maus discloses that the accuracy of a ***given*** catalytic converter, especially those of greater lengths, may be increased by measuring temperature at multiple locations or partial volumes of ***given***

catalytic converter. (See Maus et al. at, for example, Col. 5, lines 8-18). Maus makes no mention of altering the design of the catalytic converter by, for example, selecting shorter length catalytic converters to improve the accuracy of its diagnosis, but only discloses increasing the number of temperature sensors when the length of the catalytic converter increases. (See Maus et al. at, for example, Col. 8, lines 52-56). Similarly, Pelters et al. does not discuss this aspect of the present invention, and the Examiner fails to suggest that it does. Therefore, Applicant respectfully submits that both Maus and Pelters fails to render claim 40 obvious for the additional reason that both Maus et al. and Pelters et al. fails to disclose, teach or suggest each and every limitation of the claim.

Claim 46 is also patentable over Maus et al. in view of Pelters et al. for the additional reason that neither Maus et al. nor Pelters et al. disclose, teach or suggest modifying the starting point for changing the conditions of exhaust gases entering a catalyst based upon prior determinations of the catalyst's condition, as recited in claim 46. Maus fails to disclose, teach or suggest relating the time that the "operational condition of the internal combustion engine is briefly disrupted" to any prior determinations of the catalyst's condition. (See Maus et al. at, for example, Col. 8, lines 16-20). Again, the Examiner fails to indicate anywhere in Pelters that discloses such unique aspects of the present invention, because there is none. Therefore, Applicant respectfully submits that Maus and Pelters fails to render claim 46 obvious for at least the reason that both Maus et al. and Pelters et al. fail to disclose, teach or suggest each and every limitation of the claim.

Based on the aforementioned, Applicant respectfully submits that claims 1, 2, 7-9, 11-16, 18, 20, 29-31, 36, 38-40, and 43-46 are not rendered obvious by Maus et al. in view of Pelters et al., and are patentable for at least the reasons given above.

The Examiner rejected claims 24-26, and 28 under 35 USC § 103(a) as being unpatentable over Fujimoto et al. (US Patent 5,591,905) in view of Pelters et al. This rejection is respectfully traversed. As noted above, claims 24 and 28 have been amended to more clearly claim the invention of the subject application. For the following reasons, claims 24-26, and 28 are patentable over Fujimoto et al. in view of Pelters et al.

Fujimoto et al. fails to anticipate claims 24-26, and 28 for at least the reason that Fujimoto et al. does not disclose each and every limitation of the claims. In particular, Fujimoto et al. does not disclose "controlling a change in fuel quantity to at least one **selected individual cylinder ... without turning off ignition operation**" as included in claims 24-26, and 28. Nor does Fujimoto et al. teach or suggest such a limitation. Rather, Fujimoto et at., like Maus et al., discloses a system that introduces changes in fuel quantity **equally to all cylinders** to diagnose a catalyst.

Fujimoto fails to disclose changing fuel quantities of selected individual cylinders as it designates an air-fuel ratio control for "carrying out of air-fuel ratio of the **engine**." (See Fujimoto et al. at, for example, Col. 5, lines 5-7 and lines 15-17). Further evidence of Fujitmoto's failure to disclose said limitation is provided in that an intake pipe supplies a [single] **mixture** to the **engine** to be injected by an [single] **injector**. (See Fujimoto et al. at, for example, Col. 5, lines 34-41). As noted in Fujimoto et al. at col. 9, lines 5-7, a single fuel injector signal J is disclosed where "the fuel injection signal J is set to be

longer, and the air-fuel ratio is set on the rich side." When referring to the system in Fig. 3, Fujimoto et al. at col. 5, lines 37-40, describes that "4 is an intake manifold mounted at a connecting portion between the downstream side of the intake pipe 3 and the engine 1, and 5 is an injector mounted in the upstream of the intake pipe 2 to inject fuel." Therefore, it is clear that Fujimoto et al. discloses a system that controls the "engine" such that **all individual cylinders' are controlled alike with one injector**. Because Fujimoto et al. teaches his system is responsive to the exhaust gases of **all** engine cylinders, it is therefore unable to control the quantity of fuel to **selected individual cylinders** as has been disclosed by the Applicant. The fact is that Fujimoto et al. fails to indicate anywhere that the individual cylinders of the engine are set independently to gas and air flows different from one another as is taught by the present invention. Fujimoto et al. does not specifically discuss that the ignition is turned off at any particular point, but does indicate the ignition coil 13 is connected to a power transistor for conduction and cutting off the ignition coil 13 and has an interruption signal INT that is provided to the microcomputer 100. (See Fujimoto at col. 5, lines 52-60 and col. 6, lines 25-30.) Thus, it is possible that the ignition may be turned off to produce an increase in unburned full to the catalyst in Fujimoto. Therefore, Applicant respectfully submits that Fujimoto fails to teach or suggest changing the conditions of "**selected individual cylinders ... without turning off ignition operation**" as included in the limitations of claims 24-26, and 28 of the present invention and the claims are not anticipated (or rendered obvious) by Fujimoto et al. for at least the reason that Fujimoto fails to teach or suggest each and every limitation of the claims.

As mentioned above, it is clear that Pelters et al. does turn off ignition operation to provoke a change in catalyst temperature. And Pelters may not show selecting individual cylinders as required by the claims. Further, the Examiner only provides conclusions as to how or why one skilled in the art would combine Fujimoto with Pelters to obtain the invention claimed in claims 24-26 and 28, stating that it would be "for more efficient controlling the air fuel ratio to judge a condition of the catalyst." This does not explain why or how one would select various aspects of Pelters and Fujimoto to combine their systems in the particular and precise way necessary to obtain the combination of elements and limitations claimed herein by the Applicant. In this case, the Examiner has used impermissible hindsight reasoning to do so and has used general reasoning without any showing of motivation or suggestion for the particular combination. There is no suggestion or motivation in the art or the references in this case for doing such a combination in the particular manner necessary to achieve the claimed invention. Further, there is no evidence other than the Examiner's bald statement that combining some or all of the system or process of Pelters would result in a more efficient controlling of the air fuel ratio in a way that would allow a better judgment of the condition of the catalyst. However, even assuming for the sake of argument that Pelters et al. does disclose selecting individual cylinders and that the Examiner is correct in the conclusive reasoning for combining the references, Applicant respectfully submits that one skilled in the art when combining the process of Pelters et al. with the process from Fujimoto et al. would come up with a process that also **turns off ignition operation** (as clearly used in Pelters) so as to achieve the maximum speed and efficiency in diagnosing the catalyst.

Claims 24-26, and 28 are also patentable over Fujimoto et al. in view of Pelters et al. for at least the additional reason that Fujimoto et al. and Pelters do not disclose "cycling an oxygen sensor's output prior to stoichiometric closed loop fuel control operation" as included in claims 24-26, and 28. Rather, Fujimoto merely ***detects*** a change in oxygen sensor output as it "reads the air-fuel ratio signals V1 and V2" upon determining that the catalytic converter has reached a "temperature which can provide efficient oxidation/reduction." (See Fujimoto et al. at, for example, Col 10, lines 24-25, Col. 9, lines 26-29, and lines 36-52). Fujimoto fails to disclose enabling *any* changes prior to stoichiometric closed loop fuel control as no further steps are taken if the catalytic converter is not at an efficient temperature. (See Fujimoto et al., for example, at Col. 10, lines 21-27). Fujimoto instead discloses a system that depends upon stoichiometric closed loop control as it requires "a state suitable for deciding deterioration of the catalytic converter, that is, a steady state of the engine." (See Fujimoto et al., for example, at Col. 10, lines 1-9). As evidenced by the lack of transient measurements occurring in the early stages of Figure 7 when operating rich, in contrast to the present invention's Figure 4, Fujimoto fails to disclose taking steps to toggle the oxygen sensor before stoichiometric closed loop control. (See Fujimoto et al. at, for example, Figure 7). Any toggling of the oxygen sensor in the system disclosed by Fujimoto is due to the engine having reached stoichiometric closed loop control. As evidenced by the Examiner's lack of discussion about Pelters relative to these limitations, Pelters does not even discuss these features. Therefore, Applicant respectfully submits that Fujimoto and Pelters fail to disclose, teach or suggest "cycling an oxygen sensor's output prior to stoichiometric closed loop fuel control operation" as included in claims 24-26, and 28 of

the present invention and the claims are not rendered obvious by Fujimoto et al. in view of Pelters for at least the reason that Fujimoto and Pelters fail to disclose, teach or suggest each and every limitation of the claims.

Based on the aforementioned, Applicant respectfully submits that claims 24-26, and 28 are not rendered obvious by Fujimoto et al. and/or Pelters, and are patentable for at least the reasons given above.

The Examiner rejected claims 3-6 under USC § 103 (a) as being unpatentable over Maus et al. (US Patent 5,610,844) in view of Pelters et al. (US Patent 5,435,172) as applied to claim 1, and further in view of Holl (US Patent 3,785,151). This rejected is respectfully traversed. For the following reasons, claims 3-6 are patentable over Maus et al. in view of Pelters, and in further view of Holl.

Applicant respectfully submits that the Examiner has failed to make a prima facie case of obviousness and that claims 3-6 are unpatentable over Maus et al. in view of Pelters et al. (US Patent 5,435,172), in further view of Holl, because the reference fails to teach each and every limitation of the claims 3-6. Further, Applicant respectfully submits that there is no teaching, suggestion or motivation for combining the references in the manner suggested by the Examiner.

Claims 3-6 depend upon claim 1, and thus have all the limitations of claim 1. As noted above, Maus et al. and Pelters et al. fails to teach or suggest the claimed invention of claims 3-6 for at least the reason that it does not show "controlling changes to conditions of **selected individual engine cylinders ... without turning off ignition operation**" Holl fails to make up the deficiencies of Maus et al. and Pelters et al. because, like Maus et al. and Pelters et al., it fails to disclose, teach, or suggest controlling

changes to conditions of selected individual engine cylinders for diagnosing a catalyst without turning off the ignition. Rather, Holl recirculates exhaust gases directly into the exhaust manifold so as to introduce recirculated exhaust gases **equally to all cylinders**. (See Holl at, for example, Col. 2, lines 28-33; Col. 3, lines 10, 16). Further, Holl is silent on and fails to even relate to diagnosing a catalyst and thus would need to rely on the disclosure of Maus and Pelters in this respect. Both Maus and Pelters disclosed turning off the ignition for increasing the fuel provided to diagnose the catalyst. Therefore, Holl does not teach or suggest controlling conditions of "**selected individual engine cylinders ... without turning off ignition operation**" as required by claim 1, and the claims are patentable over Maus et al., Pelters, and Holl, either individually or in combination, for at least these reasons.

Further, there is no suggestion or motivation for combining Maus et al. in view of Pelters et al., and in further view of Holl, particularly for the purpose of claims 3-6. At least one embodiment of the present invention in claims 3-6 is directed to changing concentrations of nitrogen oxide(s) gases at the catalyst in order to ***determine whether the operation of the catalyst is malfunctioning***. Holl, however, is directed at changing concentrations of nitrogen oxides(s) gases at the catalyst for the ***sole purpose of decreasing a catalyst's temperature for over-temperature protection to the catalytic converter***. (See Holl at, for example, Col. 3, lines 10-26). Holl also teaches away from the claimed invention by teaching that "only a relatively small percentage of the exhaust gases" are recycled. (See Holl at, for example, Col. 1, lines 50-54). That the invention embodied in claims 3-6 may require recycling large amounts of nitrogen oxide(s) in order to detect a change in temperature provides further evidence of a lack of

suggestion or motivation to combine Maus et al., Pelters et al., and Holl to achieve the claimed invention. Therefore, without more, one skilled in the art would not be motivated to combine Maus et al., with Pelters et al., and with Holl to achieve the invention of claims 3-6.

Claim 5 is also patentable over Maus et al. and Pelters et al. for at least the additional reason that Maus et al. and Pelters et al. do not disclose that a catalytic converter design can be selected to improve the accuracy of its diagnosis or discernment of temperature, as recited in claim 5. Rather, Maus and Pelters disclose that the accuracy of a ***given*** catalytic converter, especially those of greater lengths, may be increased by measuring temperature at multiple locations or partial volumes of ***given*** catalytic converter. (See Maus et al. at, for example, Col. 5, lines 8-18). Maus (nor Pelters) makes no mention of selecting shorter length catalytic converters to improve the accuracy of its diagnosis, but only of increasing the number of temperature sensors when the length of the catalytic converter increases. (See Maus et al. at, for example, Col. 8, lines 52-56). Again, Holl fails to make up these deficiencies of Maus et al. and Pelters et al. Holl does not disclose selecting a catalytic converter design to make detection of a malfunctioning catalyst more accurate. Therefore, Applicant respectfully submits that Maus and Holl, either individually or combined, fail to render obvious claim 5 for at least the reason that Maus et al., Pelters et al., and Holl fail to disclose, teach or suggest each and every limitation of the claim.

Based on the aforementioned, Applicant respectfully submits that claims 3-6 are not rendered obvious over Maus et al. in view of Pelters, and in further view of Holl and are patentable for at least the reasons given above.

The Examiner rejected claim 19 under USC § 103 (a) as being unpatentable over Maus et al. (US Patent 5,610,844) in view of Pelters et al. as applied to claim 11, and in view of Fujimoto (US Patent 5,591,905). This rejected is respectfully traversed. For the following reasons, claim 19 is patentable over Maus et al. in view of Pelters, in further view of Fujimoto et al.

Applicant respectfully submits that Examiner has failed to make a prima facie case that claim 19 is unpatentable over Maus et al. in view of Pelters et al., and in further view of Fujimoto because the references fail to teach or suggest each and every limitation of the claim 19.

Further, the Examiner has failed to indicate how or why one skilled in the art would combine the teachings of Maus et al., Pelters et al., and Fujimoto et al., in the exact manner necessary to achieve the claimed invention as defined by claim 19. Such a combination is highly unlikely to be supported by any reasonable basis for selecting only the particular aspects of each disclosure to achieve the claimed invention. Applicant respectfully submits that the Examiner has failed to provide such a reasonable basis here.

Claim 19 depends upon claims 1, 9, and 11, and thus has all the limitations of claims 1, 9, and 11. As noted above, Maus et al. and Pelters et al. fails to teach or suggest the claimed invention of claim 19 for at least the reason that it does not show "controlling changes to conditions of **selected individual engine cylinders ... ... without turning off ignition operation.**" Fujimoto fails to make up the deficiencies of Maus et al. because, like Maus et al., it fails to disclose, teach, or suggest controlling changes to conditions of selected individual engine cylinders for diagnosing a catalyst

without turning off ignition operation. Rather, as explained in more detail above, Fujimoto designates an air-fuel ratio control for "carrying out of air-fuel ratio of the **engine**." (See Fujimoto et al. at, for example, Col. 5, lines 5-7; Col. 5, lines 15-17.) Further evidence of Fujitmoto's failure to disclose said limitations is provided in that an intake pipe supplies a single **mixture** to the **engine** to be injected by a single **injector**. (See Fujimoto et al. at, for example, Col. 5, lines 34-41). As noted above, there is no reasonable basis, motivation, or suggestion for combining Fujimoto with Pelters in the manner necessary to obtain the claimed limitations. This is also true for combining Maus, Pelters, and Fujimoto. Therefore, Maus, Pelters, and Fujimoto do not teach or suggest, individually or in any reasonable combination, controlling conditions of "**selected individual engine cylinders ... ... without turning off ignition operation**" as required by claims 1, 9, 11 and 19, and claim 19 is thereby patentable over Maus et al., Pelters et al, and Fujimoto, either individually or in combination.

Based on the aforementioned, Applicant respectfully submits that claim 19 is not rendered obvious over Maus et al. in view of Pelters et al, and in further view of Fujimoto et al., and is patentable for at least the reasons given above.

The Examiner rejected claim 27 under USC § 103 (a) as being unpatentable over Fujimoto et al. (US Patent 5,591,905) and Pelters et al. as applied to claim 24, in further view of Yamashita et al. (US Patent 5,727,383). This rejected is respectfully traversed. For the following reasons, claim 27 is patentable over Fujimoto et al. in view of Pelters et al., and in further view of Yamashita et al.

Applicant respectfully submits that once again the Examiner has failed to make a prima facie case that claim 27 is unpatentable over Fujimoto et al. in view of Pelters, and

in further view of Yamashita et al. because the references fail to teach each and every limitation of the claim 27. Further, Applicant respectfully submits that there is no suggestion or motivation for combining the three references in the manner suggested by the Examiner.

Here, the Examiner has failed to indication how or why one skilled in the art would combine the teachings of Fujimoto et al., Pelters et al., and Yamashita et al. in the exact manner necessary to achieve the claimed invention as defined by claim 27. Such a combination is highly unlikely to be supported by any reasonable basis for selecting only the particular aspects of each disclosure to achieve the claimed invention. Applicant respectfully submits that the Examiner has failed to provide such a reasonable basis here.

Claim 27 depends upon claim 24, and thus has all the limitations of claim 24. As noted above, Fujimoto et al. and Pelters et al. fails to teach or suggest the claimed invention of claim 24 for at least the reason that it does not show "controlling a change in fuel quantity to at least one **selected individual cylinder ... without turning off ignition operation.**" Yamashita fails to make up the deficiencies of Fujimoto et al. because, like Fujimoto et al., Yamashita fails to disclose, teach, or suggest controlling changes to conditions of selected individual engine cylinders. Rather, Yamashita creates "an air-fuel mixture of a predetermined air-fuel ratio...[and] **the mixture** is fed to each cylinder" so as to introduce the same air-fuel mixture **equally to all cylinders**. (See Yamashita et al. at, for example, Col. 5, lines 1-13). Therefore, Yamashita does not teach or suggest controlling conditions of "**selected individual cylinders**" as required by claims 24 and 27, and the claims are patentable over Fujimoto et al. and Yamashita et al., either individually or in combination.

Further, there is no suggestion or motivation for combining Fujimoto et al. in view of Pelters et al., and in further view of Yamashita, particularly for the purpose of claim 27. Rather than point to suggestion or motivation described in the references, the Examiner appears to take Official Notice that one skilled in the art would combine the reference, particularly with respect to combining Yamashita that utilizes oxygen sensor based diagnosis (rather than temperature sensor based according to the claimed invention). This use of Official notice is traversed and the Applicant respectfully request the Examiner to point to where within the Yamashita reference there is suggestion or motivation, or provide some other evidence to show why and how one skilled in the art would reasonably combine Yamashita with Fujimoto and Pelters in the manner necessary to disclose each and every element and limitation of claim 27.

Yamashita discloses a method of ***determining*** catalyst activation on the basis of oxygen sensor ***feedback, after closed loop control.*** (See Yamashita et al. at, for example, Col. 6, lines 40-44). Yamashita first checks to ensure that "at a time t3, air-fuel ratio feedback control is started" and only after closed loop is started "at a time t4, a check is made to see if the...catalytic converter is activated on the basis of the delay in the inverting period of the downstream O2 sensor." (See Yamashita et al. at, for example, Col. 6, lines 40-44). The method disclosed in Yamashita et al. is only capable of determining catalyst activation *after* closed loop control *on the basis of oxygen sensor feedback.* At least one embodiment of the present invention in claim 27, however, is directed to ***confirming*** catalyst activation on the basis of oxygen sensor ***cycling, before closed loop control (outside a stoichiometric control range after cold start).*** The method disclosed in at least one embodiment of the present invention in claim 27 is

capable of determining catalyst activation *before* closed loop control *on the basis of catalyst temperature* and confirming catalyst activation *before* closed loop control *on the basis of oxygen sensor cycling*, irrespective of oxygen sensor feedback. Pelters fails to disclose operating before closed loop control. Therefore, without more, one skilled in the art would not combine Fujimoto et al., Pelters, and Yamashita et al. to achieve the invention of claim 27 because there is no suggestion or motivation for combining these three references in the manner necessary to meet the language of the claim.

Based on the aforementioned, Applicant respectfully submits that claim 27 is not rendered obvious over Fujimoto et al. in view of Pelters, and in further view of Yamashita et al., and is patentable over them for at least the reasons given above.

The Examiner rejected claims 32 and 33 under USC § 103 (a) as being unpatentable over Maus et al. (US Patent 5,610,844) in view of Pelters et al. as applied to claim 20 (and claim 1), and in further view of Yamashita et al. (US Patent 5,727,383). This rejected is respectfully traversed. For the following reasons, claims 32 and 33 are patentable over Maus et al. in view of Pelters et al., and in further view of Yamashita et al.

Applicant respectfully submits that Examiner has failed to make a prima facie case that claims 32 and 33 are unpatentable over Maus et al. in view of Pelters et al., and in further view of Yamashita et al. because the references fail to disclose, teach or suggest each and every limitation of the claims 32 and 33. Further, Applicant respectfully submits that there is no suggestion or motivation for combining the references in the manner suggested by the Examiner.

Here again, the Examiner has failed to adequately explain why and how such a three way combination would occur. The Examiner fails to indication how or why one skilled in the art would combine the teachings of Maus et al., Pelters et al., and Yamashita et al. in the exact manner necessary to achieve the claimed invention as defined by claims 32 and 33. Such a combination is highly unlikely to be supported by any reasonable basis for selecting only the particular aspects of each disclosure to achieve the claimed invention. Applicant respectfully submits that the Examiner has failed to provide such a reasonable basis here.

Claims 32 and 33 depend upon claim 29, and thus have all the limitations of claim 29. As noted extensively above, Maus et al. fails to disclose, teach or suggest the claimed invention of claims 32 and 33 for at least the reason that it does not show "controlling changes to conditions of **selected individual engine cylinders ... without turning off ignition operation**." Yamashita fails to make up the deficiencies of Maus et al. and Pelters (as described above) because, like Maus et al., Yamashita fails to disclose, teach, or suggest controlling changes to conditions of selected individual engine cylinders. Rather, as noted above, Yamashita creates "an air-fuel mixture of a predetermined air-fuel ratio...[and] **the mixture** is fed to each cylinder" so as to introduce the same air-fuel mixture **equally to all cylinders**. (See Yamashita et al. at, for example, Col. 5, lines 1-13). Further, the Yamashita fails to discuss or disclose anything about operating selected individual engine cylinders without turning off ignition operation. Therefore, Yamashita does not disclose, teach or suggest controlling conditions of "**selected individual cylinders ... without turning off ignition operation**." as required by claim 29, and the claims are patentable over Maus et al. in

view of Pelters et al., and in further view of Yamashita et al., either individually or in combination.

Further, there is no suggestion or motivation for combining Maus et al. in view of Pelters et al., and in further view of Yamashita, particularly for the purpose of claims 32 and 33. As explained in detail above, Yamashita discloses a method of determining catalyst activation on the basis of ***oxygen sensor feedback, after closed loop control.*** (See Yamashita et al. at, for example, Col. 6, lines 40-44). Yamashita first checks to ensure that "at a time t3, air-fuel ratio feedback control is started" and only after closed loop is started "at a time t4, a check is made to see if the...catalytic converter is activated on the basis of the delay in the inverting period of the downstream **O2 sensor**." (See Yamashita et al. at, for example, Col. 6, lines 40-44). The method disclosed in Yamashita et al. is only capable of determining catalyst activation *after* closed loop control *on the basis of oxygen sensor feedback.* There is no suggestion or motivation in any of Maus et al., Pelters et al., or Yamashita et al. for combining the references in the manner necessary to achieve all the elements and limitations of claims 32 and 33 of the present invention, and the Examiner fails to point to any. Rather, the Examiner has relied upon what appears to be a loose explanation based on Official Notice. This is respectfully traversed and Applicant respectfully requests the Examiner to come forward with some evidence to support the proposition for combining Maus et al., Pelters et al., and Yamashita et al. in the manner necessary to render claims 32 and 33 obvious.

Therefore, Applicant respectfully submits that without more, one skilled in the art would not combine Maus et al., Pelters et al. and Yamashita et al. to achieve the invention of claims 32 and 33.

Once again, Applicant thanks the Examiner for noting that claims 10, 17, 21-23, 34, 35, 37, 41, and 47-49 contain allowable subject matter.

Based on the aforementioned, Applicant respectfully submits that all of the pending claims, claims 1-51, are patentable over all of the cited and applied references including Maus et al., Pelters et al., Holl, Fujimoto et al., and Yamashita et al. Therefore, Applicant respectfully requests that claims 1 - 51 be allowed and the present application be passed to issue at the earliest possible time.

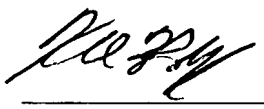
If for any reason the Examiner does not conclude that all of claim 1-51 are now patentable, Applicant respectfully request and Examiner Interview to fully discuss the remaining rejections and claims that are not allowable.

Applicants hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to the charge card identified in the credit card form provided with the filing of the application.

If for any reason the Examiner believes that the present application is not now in condition for allowance, the Examiner is requested to contact the undersigned at the

telephone number listed below or on my mobile telephone at 703-731-7220.

Respectfully submitted,



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